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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/772,431	02/06/2004	Mitsuharu Tai	NITT.0188	8944

7590 11/03/2006  
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EXAMINER
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VU, PHU

ART UNIT	PAPER NUMBER
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2871

DATE MAILED: 11/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/772,431

Applicant(s)

TAI ET AL.

Examiner

Phu Vu

Art Unit

2871

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on 08 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 2-6, 9, 10 and 12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 12 is/are allowed.
- 6) ☒ Claim(s) 2-4 and 6 is/are rejected.
- 7) ☒ Claim(s) 5, 9 and 10 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Response to Arguments***

Applicant's arguments filed 7/6/2006 have been fully considered but they are not persuasive regarding claims 2-4, and 6.

Regarding claims 2-4, the limitation of "constituting a first circuit" and "constituting a second circuit" does not render claims 2-4 patentable. Since first and second circuit types/regions is open to interpretation any arbitrary grouping of TFTs will meet the limitations of claims 2-4 as long as the first TFT is in a different circuit (ie different pixels) and second has an angular orientation of the channel perpendicular to the first. Rejection is presented below.

Regarding claim 6, application has argued improper hindsight in combining the references in claim 6. This may apply to claims 5, 9, 10 and 12 however does not apply to claim 6 since there is only a single specification for grain length and width and peak to valley surface height. The rejection provides motivation cited from each reference to form grains as claimed.

Applicant's arguments, see Remarks, filed 7/6/2006, with respect to claims 5, 9, 10 and 12 have been fully considered and are persuasive. The rejections of claims 5, 9, 10 and 12 have been withdrawn.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**Claims 2-4 are rejected under 35 U.S.C. 102(b) as being anticipated by  
Yamauchi et al US 6512504.**

**Regarding claims 2-4,** Yamauchi discloses an image display device provided with an active-matrix substrate comprising: an insulating substrate (fig. 1 element 11); and a plurality of circuit regions fabricated on said insulating substrate and including at least a pixel section and a pixel driving circuit section each of said pixel section and said pixel-driving circuit section having a polycrystalline silicon semiconductor film, wherein at least one of said plurality of circuit regions has a first type of a thin film transistor (fig. 2B 201) and a second type of a thin film transistor (fig. 2A), and an angular orientation of current flowing through a channel of said first type of a thin film transistor is nonparallel with an angular orientation of a direction of current flowing through a channel of the second type thin film transistor. Fig. 2B does not show the currents having different angular orientations however from fig. 2A it can be seen that the source to drain of the respective TFTs are perpendicular (see fig. 2A elements 31 and 32 and 13 and 14). Considering the TFT corresponding to 201 in figure 2A of the left pixel comprise the first circuit region constituting a first circuit and the second TFTs corresponding to 202 for the right pixel comprise the second circuit region constituting the second circuit than the limitations is met. Since the first and second circuit regions are formed as different circuits (ie first pixel and second pixel) and have orientations perpendicular to each other. The limitation of all TFTs passing currents in one region in one single direction is met in view of this interpretation.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamauchi in view of Ogawa US Patent No. 6479837 in view of Shinigawa et al 20030160239.**

**Regarding claims 6**, Yamauchi discloses all the limitations of claim 6 except except the peak-to-valley height difference is equal or smaller than 6 nm, and grains of rectangular shape of .3 microns to 2 microns in width and 4 microns or more in length. Yamauchi does teach plural kinds of surface configurations (for example plural angular orientations (see claim 3 rejection)). Ogawa discloses a thin film transistor with polycrystalline silicon with a grain size of 3-5 microns in the scanning direction and .5 to 2 microns (column 10 lines 3-13) in the microns in the other direction for high mobility (ie performance) ( $300 \text{ cm}^2 / \text{Vs}$ ) (see column 5 lines 10 – 25). The MPEP states in the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976). The limitation of "rectangular" is considered met because applicant's grains are not formed in exact rectangles (see fig. 4 and 13). Therefore any shape resembling a rectangle meets this limitation.

Shinigawa discloses a high performance TFTs with surface roughness (peak-to-valley) less than 5 nm ([0010]). Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to optimize TFTs in a second to have grain sizes of 4 or more microns in length and .5 to 2 microns in width and lower roughness to less than 5 nm to improve transistor mobility/performance.

***Allowable Subject Matter***

Claim 5 and 9-10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 12 is allowed.

The following is a statement of reasons for the indication of allowable subject matter: Regarding claims 5, 9-10 and 12, there is no prior art of record that teaches the combination of:

A.) first type circuit region having a peak-to-valley height difference in said channel, source and drain is less than 5 nm.

B.) first type circuit regions having crystalline grains of rectangular shape of .4 microns to 2 microns and width of 5 microns in length.

C.) second type circuit regions having TFTs with average grain diameter is 1 micron or smaller

D.) second type circuit regions having a peak-to valley height difference of greater than 20 nm in the channel, source and drain regions.

The references as sighted teach properties A-D separately however they fail to provide motivation to combine A and B for first circuit region and C and D for second circuit region. As the references and the prior art fail to designate any particular way to combine limitations of A, B, C, and D especially since A and D are mutually exclusive.

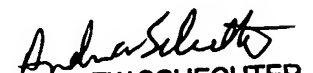
### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phu Vu whose telephone number is (571)-272-1562. The examiner can normally be reached on 8AM-5PM M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571)-272-1787. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Phu Vu  
Examiner  
AU 2871

  
ANDREW SCHECHTER  
PRIMARY EXAMINER